

## CLAIMS

1. Method in a heat exchange system, in which method

- 5           – exhaust gas steam is led by a heat exchange surface of the heat exchange system
- a certain part of the heat exchange surface of the heat exchange system is cleaned with a cleaning equipment having an operation parameter status
- 10          – particles are released from the heat exchange surface
- the released particles are led into the exhaust gas stream of the heat exchange system
- amount and/or type of the released particles in the exhaust gas stream is measured and particle measurement data of these particles is created on the basis of these measurements
- 15          – information of the fouling is created in an electronic memory by linking together and storing in the electronic memory coordinates of the part of the heat exchange surface of the heat exchange system being cleaned and the measurement data created during the cleaning of said part.

20

2. Method according to claim 1 wherein

- 25           – the operation parameter status of the cleaning equipment during the cleaning of the part of the heat exchange surface of the heat exchange system is stored in the electronic memory and linked with coordinates of the part being cleaned with the cleaning equipment and the particle measurement data created during the cleaning of the part.

3. Method according to claim 2 wherein the operation parameter status of the cleaning equipment stored in the electronic memory comprises status of at least one of the following operation parameters:

30

- identification data of the cleaning equipment
- coordinates of the cleaning equipment in the heat exchange system

- operational status of the cleaning equipment, i.e. is the cleaning equipment running or not running,
- speed of the cleaning equipment
- information on the effect of the cleaning equipment, e.g. steam pressure used.

5

4. Method according to claim 1 wherein the cleaning is done by a soot blower equipment.

10 5. Method according to claim 1 wherein the cleaning equipment comprises one of the following

- steam based soot blower
- acoustic soot blower
- air gun
- hammer cleaner
- mechanical cleaner, such as steel-wire brush.

15

6. Method according to claim 1 wherein mass flow of particles in the exhaust gas stream is measured.

20

7. Method according to claim 1 wherein the information of the fouling stored in the electronic memory is processed as a function of the heat exchange surface coordinates to find

- an optimal time to start cleaning of a particular part of the heat exchange surface of the heat exchange system.

25

8. Method according to claim 1 wherein the information of the fouling stored in the electronic memory is processed as a function of the heat exchange surface coordinates to find

- optimal cleaning speed for a cleaning equipment of a particular part of the heat exchange surface of the heat exchange system.

30

9. Method according to claim 1 wherein the information of the fouling stored in the electronic memory is processed as a function of the heat exchange surface coordinates to find

- 5           – optimal operation parameters for the cleaning equipment for cleaning a particular part of the heat exchange surface of the heat exchange system.

10. Method according to claim 7, 8 or 9, wherein the optimization is based on one or more of the variables:

- 10           – time to be elapsed between two cleanings of a particular part of the heat exchange surface of the heat exchange system  
              – fouling tendency of ash on a particular part of the heat exchange surface  
              – carbon content in ash.

15

11. Method according to claim 1 wherein the information of the fouling stored in the electronic memory is used for estimating fouling tendency on the heat exchange surfaces as a function of heat exchange surface coordinates.

20 12. Method according to claim 1 wherein the information of the fouling stored in the electronic memory is used for estimating fouling distribution on the heat exchange surfaces as a function of heat exchange surface coordinates.

13. Method according to claim 1 wherein

- 25           – particle distribution on a cross-section of the exhaust gas channel is measured and  
              – the measured data of the particle distribution is compared on previous measurements of the particle distribution  
              – fouling tendency and location for the fouling in the heat exchange  
30           system is determined by utilizing the comparison.

14. Method according to claim 1 wherein the amount and/or type of the released particles in the exhaust gas stream is measured with an Electric Charge Transfer measurement system.

5 15. Method according to claim 14 wherein

- AC and DC signals representing particles in the exhaust gas stream are produced by the Electric Charge Transfer measurement system
- fouling tendency and location for the fouling in the heat exchange system are determined by estimating from the AC and DC signals.

10

16. Method according to claim 14 wherein the amount of unburned carbon in the ash flow in the exhaust gas stream is estimated from the AC and DC signals produced by the Electric Charge Transfer measurement system in the exhaust gas stream.

15

17. Method for air/ fuel control, wherein at least one of the group of primary airflow, mill parameters, and secondary airflow, is controlled using a control algorithm, which is determined by correlation analysis between ECT signals and the output and input signals of the process in order to detect dependencies, and by fuzzy modeling of the dependencies.

20

18. Soot cleaning optimization, wherein the optimization is based on one or more of the variables: 1) time to be elapsed between runs of cleaning units k, 2) fouling tendency of the ash, and 3) carbon content in ash, which variables are estimated from ECT measurements.

25

19. System in a heat exchange system, the system comprising

30

- means for detecting operation parameter status of a cleaning equipment arranged to clean a certain part of the heat exchange surface of the heat exchange system
- means for measuring the amount and/or type of released particles in the exhaust gas stream of the heat exchange system

- means for creating particle measurement data of released particles in the exhaust gas stream
  - an electronic memory
  - 5    – means for creating information of the fouling in the electronic memory by linking together and storing in the electronic memory coordinates of the part of the heat exchange surface of the heat exchange system being cleaned and the measurement data created during the cleaning of said part.
- 10    20. System according to claim 19 wherein
- electronic means for creating control signal for the cleaning equipment of the heat exchange system.